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PATENT SPECIFICATION

(11) 1 502 217

(21) Application No. 18880/76 (22) Filed 7 May 1976
(31) Convention Application No. 2520762
(32) Filed 9 May 1975 in
(33) Federal Republic of Germany (DE)
(44) Complete Specification published 22 Feb. 1978
(51) INT CL² C05F 9/00 7/00 9/02 13/00
(52) Index at acceptance
C1B 1 2 3EX
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(19)

(54) BIOLOGICALLY ACTIVE MATERIAL

(71) I, HELMA LAMPL, a German citizen of, Sudetanstraße 2, 6920 Sinsheim-Rohrbach, Federal Republic of Germany, do hereby declare this invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a method for producing biologically active soil improvement material, and to the material produced by said method.

Methods are already known for the composting of organic waste in heaps, or composting containers, in which the material is piled loosely. An adequate supply of air is ensured by moving, mixing, or turning over on floors or in towers.

A method is also known in which shredded waste and sewage sludge containing two-thirds water are mixed. The mixture is subjected in batches to press shaping, the mass being heavily compacted to about one-third of its volume, without water passing out. The pressed products are dried by storage in the atmosphere. Continuous or discontinuous presses are used for the compaction (German Published Patent Specification 1,145,646).

The disadvantages of this known method consist of the mechanical durability of the moulded products until they reach the composting site, and those arising from the expense of presses, pallets, and handling equipment. Moreover, in many cases the supply of air is insufficient.

All known processes have the disadvantage that the expense for machines, for the composting areas used, and for personnel is very high. If for example composting is effected in heaps, although this method is very simple it requires a great deal of space. If the material undergoing composting is wet, for example when sludge is added, frequent turning becomes a problem. In the case of mechanical composting containers very great expense is entailed by buildings, handling equipment, and machines. As mentioned above, this is also true of processes working with compaction, particularly when enormous amounts of waste exist in large central plants.

It is an object of the present invention to provide a method for composting very large amounts of waste in a simple and economical manner.

The present invention provides a method of producing a biologically active soil improvement material from organic waste which comprises:

(a) depositing moist comminuted organic waste in at least two individual layers one above the other on a water draining floor.

(b) compacting each said layer before deposition thereon of a further layer, so as to produce a stratified block of compacted organic waste;

(c) forming slots in said stratified block, which slots extend into substantial proximity with said floor; and

(d) allowing said stratified block to rot so as to provide said soil improvement material.

This method provides the advantage that very large amounts of waste material can be composted on relatively small areas, while the expense for personnel and machines can be kept very low. After the rotting, which takes about three to six weeks, the stratified block can be removed for use as compost. However, if protected against water, the stratified block may be left in place until required for later use, without the biological activity of the material being thereby lost. The biological activity can be activated at the place of use by wetting with water and humidification can then proceed in the ground, compost heap, or hot bed.

Conveniently the slots are formed by removing a part of the stratified block and depositing it on the stratified block on either side of the slot so as to form channels on the stratified block between the material

taken out from adjacent slots. This provides the advantage that excess water can accumulate in this channel.

In a preferred embodiment each of the individual layers is formed to a height of about 0.5 metre before compaction. Each layer is preferably compacted to from one-third to one-quarter of its original height before deposition thereon of a subsequent layer. The slots are usually cut out substantially parallel to one another at intervals of from 0.5 to 1 metre, and usually have a width of about 0.1 metre. Desirably as many layers are laid one above the other, each being compacted, as are required to form a stratified block of from 1 to 2 metres in height. The surface of the stratified block can be left uncovered if only brief rotting is desired though desirably a waterproof sheet can be laid over the upper most layer and fixed in position if the rotting is to take longer. By means of the sheet a part of the water of evaporation from the rotting block may be condensed on the lower side of the sheet and is thus retained. The very wet, hot atmosphere thus formed in the slots assists the composting operation.

A further saving of space can be achieved if after the rotting of a stratified block and after the removal of the sheet, when one has been used, this stratified block is used as the floor for another stratified block. For this purpose the required rotting period will be from about three to six weeks to form a stratified block suitable for use in this way.

The method of the invention can be carried out in an apparatus comprising two walls spaced apart and having a length for accommodating said stratified block, and a water draining floor disposed between said walls; depositing means for depositing said moistened comminuted organic waste in layers on said water draining floor one above the other; compacting means for compacting said layers; and slot cutting means for forming said slots. The water draining floor may be a grid, or a concrete floor having covered water channels or a floor, e.g. of concrete having drainage pipes inserted in it. As previously mentioned, the floor may also be formed by the surface of a rotted stratified block.

Further details of the invention will become apparent from the following description of a preferred embodiment illustrated with the aid of the accompanying drawings.

Figure 1 shows diagrammatically a sectional view of a stratified compost block being made according to the method of the present invention, and

Figure 2 shows a partial sectional view at an angle of 90° to the view shown in Figure 1.

As can be seen in Figure 1, a number of diagrammatically indicated individual compacted layers 8 are deposited on a water draining floor 1 which is permeable to water, these layers consisting of a materal comprising waste matter which has been comminuted to particle sizes of from 10 to 50 mm and which has, if necessary, been moistened with water or sludge. The uncompacted layer 9 is deposited on the floor 1, or on previously compacted layers 8, to a height of 0.5 metre with the aid of a caterpillar bulldozer 2 and is compacted by being driven over by said caterpillar. A separate compaction device may also be used for the compaction. Compacting provides a substantially horizontal surface of the compacted layer 8. The compaction ratio i.e. the ratio of the thickness of the loose uncompacted material to that of the compacted material in each layer, is between 3:1 and 4:1. As many layers are deposited and compacted as are required to form a stratified block of a height of about 1 to 2 metres. When the stratified block of individually compacted layers 8 has been completed, slots 7 are cut in it, extending substantially to the floor 1, that is to say to a depth of about 1 to 2 metres. The width of each slot is about 0.1 metre. The distance between adjacent parallel slots is at least 0.5 metre, and, depending on the material to be composted and the dampness of the material, may be up to 1 metre. As can be seen in Figure 1, a trench cutter 3 is used for cutting out the slots 7. A corresponding cutting tool may however also be provided on the caterpillar 2 used for compacting. As can be seen in Figure 2, the material 6 taken out to form the slots 7 is deposited on the stratified block either side of the trench-like slots, so that a channel 4, in which water can subsequently collect before being drained off, is formed between the material 6 taken out from adjacent slots. As can be seen in Figure 2 the surface of the stratified block is covered with a plastics sheet 5, which prevents the escape of water, in order to enable a longer composting time.

The composting area is generally bounded by two side walls 10, of which one is shown in Figure 1. The floor between these walls may consist of a grid, a concrete floor having covered water channels, or a floor having inserted drainage pipes. If the walls are sufficiently high, the rotted stratified block may be used as a floor for supporting a further stratified block. It is however preferred to use a thinner layer of stratified block having a height from 0.3 to 0.4 metres of previously composted material as such a floor 1. In this case the slot 7 may also extend slightly into such a floor 1 as shown in Figure 1.

The compost can be cleared away by means of, for example, a mobile loader conveniently in the form of a caterpillar 2.

WHAT I CLAIM IS:—

1. A method of producing a biologically active soil improvement material from organic waste which comprises:

(a) depositing moist comminuted organic waste in at least two individual layers one above the other on a water draining floor;

(b) compacting each said layer before deposition thereon of a further layer, so as to produce a stratified block of compacted organic waste;

(c) forming slots in said stratified block, which slots extend into substantial proximity with said floor; and

(d) allowing said stratified block to rot so as to provide said soil improvement material.

2. A method as claimed in claim 1 which includes the preliminary step of moistening comminuted organic waste with a moistening agent selected from water and a sludge so as to produce the moist comminuted organic waste.

3. A method as claimed in claim 3 wherein the organic waste is in the form of particles having a particle size of from 10 to 50 mm.

4. A method as claimed in any of claims 1 to 3 wherein said slots each have an upper end and are each formed by removing a part of said stratified block and depositing said part of said stratified block on said stratified block on either side of said upper end of each said slot.

5. A method as claimed in any of claims 1 to 4 wherein before compacting, each said layer is deposited to a height of about 0.5 metre.

6. A method as claimed in any of claims 1 to 5 wherein each said layer is compacted to one-third to one-quarter of its original height.

7. A method as claimed in any of claims 1 to 6 wherein said slots are cut out of said stratified block substantially parallel to one another at intervals of from 0.5 to 1 metre.

8. A method as claimed in any of claims 1 to 7 wherein said slots are cut out to a width of about 0.1 metre.

9. A method as claimed in any of claims 1 to 8 wherein a plurality of said layers is deposited one above the other, each said layer being compacted, until a stratified block of a depth of from 1 to 2 metre is produced.

10. A method as claimed in any of claims 1 to 9 wherein a waterproof sheet is laid over the stratified block and fixed in position, whilst said stratified block is being allowed to rot.

11. A method as claimed in any of claims 1 to 11 wherein said water draining floor is selected from a grid, a concrete floor having covered water channels, and a floor having drainage pipes let into it.

12. A method as claimed in any of claims 1 to 11 wherein after said stratified block has been allowed to rot, it is used as the water draining floor for another stratified block.

13. A method as claimed in claim 12 wherein a stratified block layer of a depth of from 0.3 to 0.4 metre of a stratified block having a depth greater than 0.3 to 0.4 metres which has been allowed to rot is used to provide said water draining floor onto which further layers of said moistened comminuted organic waste can be deposited.

14. A method of producing a biologically active soil improvement material from organic waste according to claim 1, substantially as described hereinbefore with particular reference to Figures 1 and 2 of the accompanying drawings.

15. A biologically active soil improvement material when prepared by a method as claimed in any of claims 1 to 15.

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Printed for Her Majesty's Stationery Office, by the Courier Press, Leamington Spa, 1978
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

1502217 COMPLETE SPECIFICATION
1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

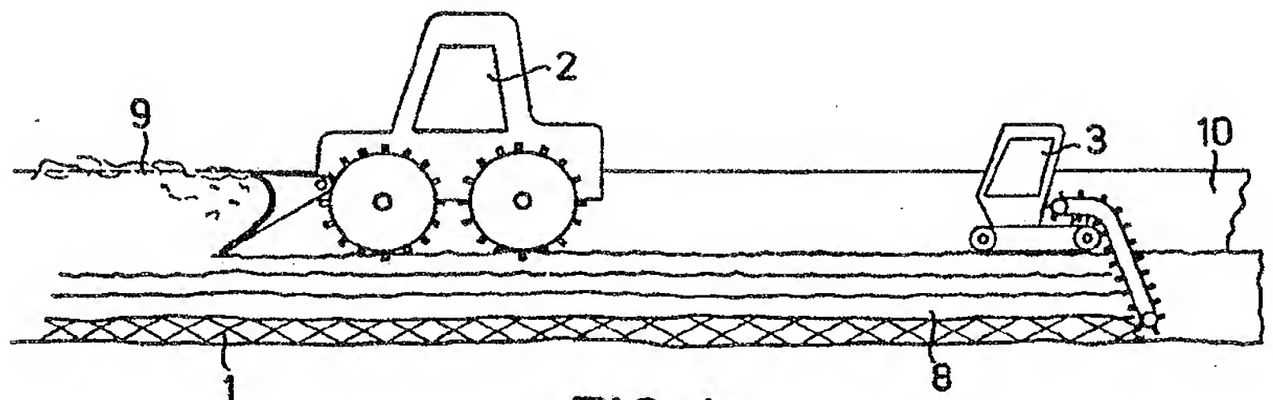

FIG. 1

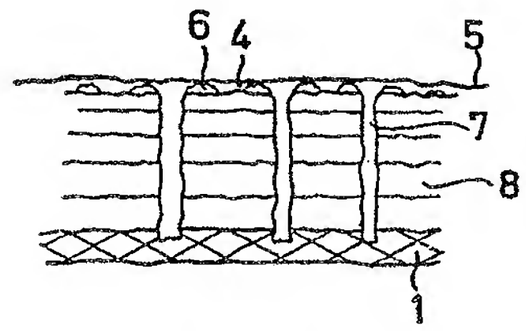

FIG. 2